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Total Number of Pages in This Submission

Application Number	10/618,499
Filing Date	11 July 2003
First Named Inventor	John Colvin
Art Unit	1711
Examiner Name	Thao T. Tran
Attorney Docket Number	124-0002US-D

ENCLOSURES (Check all that apply)

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Firm Name	Wong, Cabello, Lutsch, Rutherford & Brucculeri, LLP		
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Printed name	Sean McDermott		
Date	January 6, 2006	Reg. No.	49,000

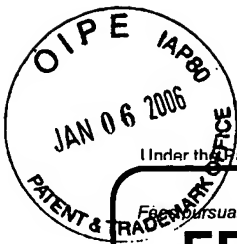
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Effective on 12/08/2004. Pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).		Complete if Known	
FEE TRANSMITTAL For FY 2005		Application Number	10/618,499
		Filing Date	11 JULY 2003
		First Named Inventor	John Colvin
		Examiner Name	Thao T. Tran
		Art Unit	1711
<input checked="" type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27		Attorney Docket No.	124-0002US-D
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Application Type	FILING FEES		SEARCH FEES		EXAMINATION FEES		Fees Paid (\$)
	Fee (\$)	Small Entity Fee (\$)	Fee (\$)	Small Entity Fee (\$)	Fee (\$)	Small Entity Fee (\$)	
Utility	300	150	500	250	200	100	
Design	200	100	100	50	130	65	
Plant	200	100	300	150	160	80	
Reissue	300	150	500	250	600	300	
Provisional	200	100	0	0	0	0	

2. EXCESS CLAIM FEES

Fee Description	Fee (\$)	Small Entity Fee (\$)
Each claim over 20 (including Reissues)	50	25
Each independent claim over 3 (including Reissues)	200	100
Multiple dependent claims	360	180

Total Claims _____ **Extra Claims** _____ **Fee (\$)** _____ **Fee Paid (\$)** _____

_____ - 20 or HP = _____ x _____ = _____

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Indep. Claims _____ **Extra Claims** _____ **Fee (\$)** _____ **Fee Paid (\$)** _____

_____ - 3 or HP = _____ x _____ = _____

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If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

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Signature		Registration No. 49,000 (Attorney/Agent)
Name (Print/Type)	Sean McDermott	Telephone 832-446-2416
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Rebecca R. Ginn

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Assignee(s):	§	
Houston Advanced Research Center	§	Art Unit: 1711
	§	
Serial No.: 10/618,499	§	Examiner: Thao T. Tran
	§	
Filed: July 11, 2003	§	Docket No.: 124-0002US-D
	§	
For: RESIN-IMPREGNATED	§	Customer No.: 29855
SUBSTRATE MATERIALS	§	
	§	

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APPEAL BRIEF

This is an appeal from the rejection of claims 1-15, 17-34, 37-39, and 41 in the Final Office Action dated August 10, 2005.



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Application No. 10/132,652
Appeal Brief



REAL PARTY IN INTEREST

The real party in interest in the above referenced patent application is Houston Advanced Research Center, a Texas corporation, having a place of business at 4800 Research Forest Drive, The Woodlands, Texas 77381.

RELATED APPEALS AND INTERFERENCES

To the present knowledge of Appellants' representative, there are currently no related appeal or interference proceedings that will directly affect, or be directly affected by, or have a bearing on, the Board's decision in the present Appeal.

STATUS OF CLAIMS

In the aforementioned Final Office Action, claims 1-15, 17-34, 37-39, and 41 were rejected. Claims 16, 35, 36, 40, and 42-44 have been cancelled. Claims 1-15, 17-34, 37-39 and 41 are appealed.

STATUS OF AMENDMENTS

A Reply to the Final Office Action mailed August 10, 2005 was filed on October 5, 2005.

The Reply presented arguments and did not amend, cancel, or add any claims to the application.

SUMMARY OF CLAIMED SUBJECT MATTER

Assignee's claimed subject matter in independent claim 41 is directed to an article having a lignocellulosic substrate (1; Fig. 1). The substrate (1) is made of lignocellulosic material, such as "wood particles, wood fibers, straw, hemp, sisal, cotton stalk, wheat, bamboo, jute, salt water reeds, palm fronds, flax, groundnut shells, hard woods, or soft woods, as well as fiberboards such as high density fiberboard, medium density fiberboard (MDF), oriented strand board and particle board." *Present Specification* at Paragraph [0013]. The lignocellulosic substrate (1) "may be molded or non-molded, and may be in the form of a strip, panel, block, sheet, veneer or the like." *Id.* at Paragraph [0014].

The substrate (1) is impregnated with a polyisocyanate material at an impregnation station (20; Fig. 1). *Id.* at Paragraph [0017]. For example, the substrate (1) is impregnated by applicator nozzles (24; Fig. 1) or by soaking. *Id.* at Paragraph [0017]-[0018]. The impregnated lignocellulosic substrate (1) includes a smooth, low-gloss surface. *Id.* at Paragraphs [0009], [0012], and [0025]. For example, the impregnated isocyanate resin material of the impregnated lignocellulosic substrate (1) is polymerized at a polymerization station (40; Fig. 1) by applying water to the impregnated substrate (1). *Id.* at Paragraph [0025]. Polymerization by water forms reaction products at the surface of the substrate (1), and these reaction products are soluble in the liquid so that "the resultant appearance of the treated surface of substrate (1) is that of a smooth, satin-like and relatively non-glossy board." *Id.*

The substrate (1) also includes a moisture content that is about 0.1 to less than 2% by weight. *Id.* at Paragraph [0015]. The substrate (1) has this moisture content after the substrate is dried at a dehydration station (10; Fig. 1) and before the substrate (1) is impregnated with the polyisocyanate material at the impregnation station (20). *Id.* at Paragraph [0015]-[0017].

GROUND OF REJECTIONS TO BE REVIEWED ON APPEAL

- A. Claims 1-15, 17-34, 37-39, and 41 stand rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement.
- B. Claims 17-34, 37-39, and 41 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,741,997 to Diehr et al. in view of U.S. Patent No. 6,458,238 to Mente et al.
- C. Claims 1-15 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,741,997 to Diehr et al. in view of U.S. Patent No. 6,458,238 to Mente et al.

ARGUMENT

A. Rejection of Claims 1-15, 17-34, 37-39, and 41 under 35 U.S.C. § 112, first paragraph

Claims 1-15, 17-34, 37-39, and 41 stand rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. The Examiner states that “amended claim 41 introduces the new limitation ‘about 0.1 to less than 2% by weight’ of the moisture content in the substrate, has no proper antecedent support in the specification as originally presented.” *See Final Office Action* at ¶ 4, page 2.

Assignee disagrees with the allegation presented in the Final Office Action, and Assignee believes that the claims have been improperly rejected under 35 U.S.C. § 112, 1st paragraph. The limitation “about 0.1 to less than 2% by weight” in independent claim 41 is supported by the originally filed disclosure. In particular, the specification states at paragraph [0015] that “the dehydration step results in lignocellulosic substrate 1 with a moisture content of less than 7% by weight, and more preferably about 0.1-2.5% by weight.” Thus, the limitation in claim 41 reciting “about 0.1 to less than 2% by weight” falls within the range of “about 0.1-2.5% by weight” that is explicitly disclosed in Assignee’s specification as originally filed. Consequently, the limitation in claim 41 reciting a moisture content of “about 0.1 to less than 2% by weight” is supported by the originally filed disclosure.

Even though the limitation in claim 41 reciting “about 0.1 to less than 2% by weight” does not correspond exactly to the range disclosed in the specification, this is insufficient to support a rejection of the claims under 35 U.S.C. § 112, 1st paragraph. The range in Assignee’s claim 41 need not correspond exactly to the range disclosed in the originally filed specification. *See In re Hayes Microcomputer Prods., Inc.*, 982 F.2d 1527, 1533, 25 USPQ2d 1241, 1245

(C.A. Fed. 1992) (" [The applicant] does not have to describe exactly the subject matter claimed."). Rather, only sufficient description is required in Assignee's specification to show that one of skill in the art could derive the claimed ranges from the disclosure. *See Vas-Cath*, 935 F.2d 1555 at 1566, 19 U.S.P.Q.2d 1111 (C.A. Fed. 1991); *See also In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976) discussed in MPEP 2163.06. In the present application, one of skill in the art can derive the claimed ranges from the disclosure because the claimed range of "about 0.1 to less than 2% by weight" is within the disclosed range of "about 0.1-2.5% by weight."

Consequently, the rejection of claim 41 under 35 U.S.C. §112, first paragraph, is improper because Assignee is not required to explicitly describe the same numerical range limitation in the disclosure in order for the range limitation in claim 41 to be properly supported. Furthermore, the rejection of claim 41 under 35 U.S.C. §112, first paragraph, is improper because one skilled in the art could derive the range limitation in claim 41 reciting "about 0.1 to less than 2% by weight" from the range of "about 0.1-2.5% by weight" in the originally filed disclosure. For at least these reasons, the claimed range of "about 0.1 to less than 2% by weight" in independent claims 41 has proper antecedent support in the specification as originally presented. Accordingly, Assignee requests the rejection of claims 1-15, 17-34, 37-39, and 41 under 35 U.S.C. § 112, 1st paragraph, be withdrawn.

B. Rejection of Claims 17-34, 37-39, and 41 under 35 U.S.C. § 103(a)

Claims 17-34, 37-39, and 41 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,741,997 to Diehr et al. ("*Diehr*") in view of U.S. Patent No. 6,458,238 to Mente et al. ("*Mente*"). In particular, the Examiner states that "Mente teaches

lignocellulosic articles, wherein the lignocellulosic material contains a moisture content of 2-15% weight for the binder resin to be efficient at forming the article (see abstract; col. 4, ln. 34-41), approximating the instantly claimed range. Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to have employed the lignocellulosic material having the moisture content, as taught by Mente, in the making of Diehr's sheet or board, for the purpose of enhancing the efficacy of the forming of the article." *Final Office Action* at ¶ 6, page 3.

Assignee respectfully traverses the contention that claims 17-34, 37-39, and 41 are rendered obvious by *Diehr* in view of *Mente* in so far as (1) the combination of *Diehr* in view of *Mente* does not teach or suggest all of the limitations of Assignee's independent claim 41, from which claims 17-34 and 37-39 depend, and (2) there is no motivation to combine and modify the teachings of *Diehr* and *Mente*.

1. Legal Principles Related to Obviousness Rejection

To establish a *prima facie* case of obviousness, three criterion must be met: (1) there must be some suggestion or motivation to make the combination; (2) there must be a reasonable expectation of success; and (3) the cited prior art references must teach or suggest all of the claimed limitations. *In re Vaeck*, 947 F.2d 488, 493, 20 U.S.P.Q.2d (BNA) 1438, 1442 (Fed. Cir. 1991); *see also* MPEP 2143. "The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination." MPEP 2143.01 *quoting In re Mills*, 916 F.2d 680, 682, 16 U.S.P.Q.2d (BNA) 1430, 1432 (Fed. Cir. 1990); *see also In re Rouffet*, 149 F.3d 1350, 1357, 47 U.S.P.Q.2d (BNA) 1453, 1458 (Fed. Cir. 1998) (The combination of the references taught every element of the claimed invention, however without a motivation to combine, a rejection based on

a *prima facie* case of obvious was held improper.). The Court of Appeals for the Federal Circuit has held time and again that “[o]bviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion or incentive supporting the combination.” *In re Bond*, 910 F.2d 831, 834, 15 U.S.P.Q.2d (BNA) 1566, 1568 (Fed. Cir. 1990), *quoting Carella v. Starlight Archery and Pro Line Co.*, 804 F.2d 135, 140, 231 U.S.P.Q. (BNA) 644, 647 (Fed. Cir. 1986); *see also, e.g., In re Stencel*, 828 F.2d 751, 755, 4 U.S.P.Q.2d (BNA) 1071, 1073 (Fed. Cir. 1987) (reversing Board holding of obviousness); *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 732 F.2d 1572, 1577, 221 U.S.P.Q. (BNA) 929, 933 (Fed. Cir. 1987) (reversing district court holding of obviousness).

2. *Diehr* in view of *Mente* Does Not Teach or Suggest All of the Limitations of Assignee’s Claims

The combination of *Diehr* in view of *Mente* does not teach or suggest all of the limitations of Assignee’s independent claim 41 because (1) neither *Diehr* nor *Mente* teach or suggest moisture contents in the range of “about 0.1 to less than 2% by weight,” as recited in claim 41, and (2) neither *Diehr* nor *Mente* teach or suggest that “a substrate” has the claimed range of moisture content “after the substrate is dried and before the substrate is impregnated with the polyisocyanate material,” as recited in claim 41.

First, neither *Diehr* nor *Mente* disclose moisture contents in the range of “about 0.1 to less than 2% by weight,” as recited in claim 41. *Diehr* discloses that “[b]irch veneers with a moisture content of 7 percent...are steeped...in a mixture of...diphenylmethane diisocyanate,...catalyst...and... dimethylformamide” (col. 7:12-16) and discloses that “[b]irch veneers ... with a moisture content of 7 percent ... are steeped...in a mixture of ... diphenylmethane diisocyanate and ... dimethylformamide” (col. 7:28-31). In addition to

disclosing birch veneers with a moisture content of 7 percent before being steeped in a mixture, *Diehr* discloses moisture contents of 10, 12, 15, and 25 percent as applied to wood chips, straw chips, and defibrator material mixed with diisocyanate. *See e.g., Diehr* at col. 5:35, 50, and 64; col. 6:1, 32, and 65; & col. 7:12-16. Therefore, *Diehr* teaches moisture contents of 7, 10, 12, 15, and 25 percent, which are unquestionably outside the range of “about 0.1 to less than 2% by weight” in Assignee’s claim 41. Further, *Diehr* does not suggest any moisture content range of less than 7 percent.

Mente discloses forming a “resinated lignocellulosic mixture ... by combining the binder resin with lignocellulosic particles having a moisture content of from 2 to 15 weight percent.” *Mente* at Abstract; *see also* col. 2:50-53. In addition, *Mente* discloses that “[i]t is important that the lignocellulosic particles have a moisture content of from 2 to 15 weight percent. In a further preferred embodiment the water content is from 3 to 12 weight percent, and most preferably from 4 to 10 weight percent” (emphasis added) *Mente* at col. 4:34-36. Thus, *Mente* teaches combining resin with particles having a moisture content from 2 to 15 weight percent, which is outside the range of “about 0.1 to less than 2% by weight” in Assignee’s claim 41. Moreover, *Mente* does not disclose impregnating a substrate and instead discloses combining particles with a resin to form a mixture. It is further noted that because *Mente* stresses it is important for *Mente*’s moisture content to be between 2 and 15, and preferably higher than 2, *Mente* appears to teach away from the claimed moisture content range.

Therefore, the combination of *Diehr* in view of *Mente* does not teach or suggest a substrate having “a moisture content that is about 0.1 to less than 2% by weight” as recited in claim 41, because (1) *Diehr* discloses moisture contents outside Assignee’s claimed range, (2) *Mente* discloses moisture contents outside Assignee’s claimed range, and (3) the moisture

contents disclosed in *Mente* are applied to particles and not to a substrate. For at least these reasons, the combination of *Diehr* in view of *Mente* cannot render Assignee's claims 17-34, 37-39, and 41 obvious.

Second, the combination of *Diehr* in view of *Mente* does not teach or suggest that "a substrate" has the claimed range of moisture content "after the substrate is dried and before the substrate is impregnated with the polyisocyanate material," as recited in claim 41. As noted above, *Diehr* discloses steeping birch veneers with a moisture content of 7 percent in a mixture of diphenylmethane diisocyanate and dimethylformamide. *See Diehr* at col. 7:12-16 & 28-31. *Diehr* appears to be silent as to whether the birch veneers are dried before being steeped in a mixture. In fact, the Present Specification states at Paragraph [0015] that "[o]rdinarily, stock lignocellulosic substrates have a moisture content of about 3-8% by weight." Therefore, it appears the *Diehr* does not disclose drying the birch veneers to a moisture content before steeping in a mixture where the moisture content is below what the birch veneer would ordinarily be expected to have.

As also noted above, *Mente* discloses combining binder resin with lignocellulosic particles having a moisture content of from 2 to 15 weight percent. *See Mente* at Abstract and col. 2:50-53. *Mente* does not disclose impregnating a substrate because *Mente* instead discloses forming a resinated lignocellulosic mixture by combining particles with binder resin. Consequently, *Mente* cannot and does not teach or suggest that "a substrate" has a moisture content of about 0.1 to less than 2.0% by weight "after the substrate is dried and before the substrate is impregnated," as recited in Assignee's claim 41.

Therefore, the combination of *Diehr* in view of *Mente* does not teach or suggest all of the limitations in claim 41 because the combination fails to disclose that "a substrate" has "a

moisture content that is about 0.1 to less than 2% by weight after the substrate is dried and before the substrate is impregnated with the polyisocyanate material,” as recited in claim 41. For at least this reason, the combination of *Diehr* in view of *Mente* cannot render Assignee’s claims 17-34, 37-39, and 41 obvious.

3. There Is No Motivation to Combine and Modify the Teachings of *Diehr* and *Mente*

Even though *Diehr* in view of *Mente* does not teach or suggest all of the limitations of claim 41, there is also no motivation to combine and modify the teachings of *Diehr* and *Mente* because (1) *Mente* discloses moisture contents as applied to particles and not a substrate and (2) *Mente* teaches away from Assignee’s claimed range.

As noted above, *Mente* does not teach or suggest moisture contents for a substrate in Assignee’s claimed range. Instead, *Mente* discloses moisture content in the range of 2 to 15 percent by weight for particles mixed with binder resin. *See e.g., Mente* at col. 4:33-41. As also noted above, *Diehr* discloses a moisture content of 7% for birch veneers steeped in diisocyanate. The other moisture contents of 10, 12, 15, and 25 percent disclosed in *Diehr* are for wood chips, straw chips, and difibrator materials mixed with diisocyanate. *See e.g., Diehr* at col. 5:35, 50, and 64; col. 6:1, 32, and 65; & col. 7:12-16 and 28-31. Therefore, there is no motivation to combine the teachings of *Diehr*’s moisture content for a birch veneer with the teachings of *Mente*’s moisture content as applied to particles.

Furthermore, *Mente* actually teaches away from moisture contents in Assignee’s claimed range. In particular, *Mente* discloses:

It is important that the lignocellulosic particles have a moisture content of from 2 to 15 weight percent. In a further preferred embodiment the water content is from 3 to 12 weight percent, and most preferably from 4 to 10 weight percent. The water is utilized during the

curing of the binder resin. **If the water content is outside of this range the binder resin is not as efficient at forming the molded article.**
[(emphasis added) *Mente* at col. 4:33-41]

In other words, *Mente* discloses that moisture contents for particles outside of *Mente*'s disclosed range of 2 to 15 weight percent are undesirable. Consequently, *Mente* teaches away from Assignee's claimed range. The fact that *Mente* teaches away from Assignee's claimed range sufficiently rebuts any attempt to modify the teachings of *Diehr* in view of *Mente* to encompass Assignee's claimed range in the *prima facie* case of obviousness of the Final Office Action. *See In re Geisler*, 116 F.3d 1465, 1471, 43 USPQ2d 1362, 1366 (Fed. Cir. 1997); *See also* MPEP 2144.05 (III).

Despite the fact that *Mente* teaches away from Assignee's claimed range, the Examiner not only combines *Mente* with *Diehr* but also attempts to extend the moisture content disclosed in *Mente* to encompass Assignee's claimed range. In particular, the Examiner states that "[w]ith respect to the arguments that *Mente* teaches away from a moisture content of less than 2%, it is hereby noted that negative teachings are also indication of a known fact taught in the prior art." *Final Office Action* at ¶ 7, page 4.

The Examiner appears to argue that it would be obvious to extend the range disclosed in *Mente* to encompass Assignee's claims range based on the fact that *Mente* recognizes that there exist moisture contents outside his disclosed range of 2 to 15 weight percent. As detailed below, this reasoning does not present a proper *prima facie* case for rendering Assignee's claims obvious, and this reasoning goes against the express teaching in *Mente* that values outside *Mente*'s disclosed range are not desirable.

It is recognized that "[t]he mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of

the combination.” MPEP 2143.01 *quoting In re Mills*, 916 F.2d 680, 682 (Fed. Cir. 1990). The mere possibility of a hypothetical value for moisture content does not provide a basis for the Examiner to modify the disclosed range in *Mente*. By extending the range disclosed in *Mente*, the Examiner has directly gone against the explicit teachings in *Mente* that values outside his range are not desirable. Neither *Diehr* nor *Mente* disclose any desirability of having a substrate with a moisture content in the claimed range of 0.1 to less than 2.0% by weight. Thus, the combination and modification of *Diehr* in view of *Mente* proposed by the Examiner in the Final Office Action is improper because neither *Diehr* nor *Mente* suggest the desirability of such.

Assignee has previously requested in the Response to the Final Office Action that the Examiner provide an Affidavit in accordance with 37 C.F.R. 1.104(d)(2) and MPEP 2144.03 stating whether the Examiner has relied on personal knowledge to support the allegation of obviousness. However, the Examiner has not provided such an Affidavit.

Therefore, there is no basis for combining *Diehr* in view of *Mente* and extending the moisture contents disclosed in these references to encompass Assignee’s claimed range. For at least these reasons, the combination of *Diehr* in view of *Mente* does not render Assignee’s claims 17-34, 37-39, and 41 obvious.

C. Rejection of Claims 1-15 under 35 U.S.C. § 103(a)

Dependent claims 1-15 also stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Diehr* in view of *Mente*. In addition to the reasons presented above, Assignee respectfully traverses the contention that claims 1-15 are rendered obvious in so far as the combination of *Diehr* in view of *Mente* does not teach or suggest all the limitations in dependent claim 1. With respect to the rejection of claim 1, the Examiner states that “[w]ith respect to process limitations, such as how the lignocellulosic material is being formed or how impregnation is carried out, it has been within the skill in the art that process limitations would have no significant weight when a product claims is being considered. See MPEP 2113.” See *Final Office Action* at ¶6, page 4.

Assignee respectfully disagrees with the contention that the process steps of claim 1 have no significant weight when considering the product by process of claim 1. More appropriately, when considering a product-by-process claim, the “structure implied by the process steps should be considered when assessing the patentability of product-by-process claims over the prior art, especially where the product can only be defined by the process steps by which the product is made, or where the manufacturing process steps would be expected to impart distinctive structural characteristics to the final product.” MPEP 2113 citing *In re Garnero*, 412 F.2d 276, 279, 162 USPQ 221, 223 (CCPA 1979). Assignee contends that the process steps of claim 1 impart distinctive structural characteristics to the resultant product, that neither *Diehr* nor *Mente* disclose all of the process steps of claim 1, and that neither *Diehr* nor *Mente* imply the distinctive structural characteristics imparted by the process steps of claim 1.

First, the process steps of claim 1 impart distinctive structural characteristics to the resultant product. Namely, claim 1 is directed to a substrate prepared by *impregnating* the

lignocellulosic material with the isocyanate resin material. *Removing* excess resin from the *impregnated* material is achieved by *impinging* air at a high flow rate upon the impregnated lignocellulosic material. In addition, *polymerizing* the resin is achieved by applying water to the impregnated lignocellulosic material.

As noted in the Present Specification, for example, impinging air on the substrate after being impregnated forces some of the excess resin not fully impregnated in the substrate further into the substrate and blows the remainder off to prevent a film or resin material from forming on the substrate's surface. *See Present Specification* at Paragraph [0024]. As also noted in the Present Specification, for example, polymerization by water forms reaction products at the surface of the substrate, and these reaction products are soluble in the liquid so that "the resultant appearance of the treated surface of substrate 1 is that of a smooth, satin-like and relatively non-glossy board." *Id.* at Paragraph [0025].

Furthermore, from independent claim 41 from which dependent claim 1 depends, the substrate has a moisture content "that is about 0.1 to less than 2% by weight after the substrate is dried and before the substrate is impregnated with the polyisocyanate material." As noted in the Present Specification, for example, being dried to such a moisture content before impregnation is believed to decrease the production of weaker urea linkages and increase the production of urethane linkages when the substrate is impregnated. *Id.* at Paragraph [0015].

In *In re Garnero*, terms such as "welded," "intermixed," "ground in place," "press fitted," and "etched" of a product-by-process claim were held to be capable of construction as structural limitations in the product-by-process claim. *See* MPEP 2113. For Assignee's dependent claim 1, the process steps of being *dried* (from independent claim 41), *impregnating* with resin, *impregnated* with resin, *impinging* air, *removing* excess resin, *polymerizing* the resin

with water are equally capable of construction as structural limitations of the building article of claim 1 because these process steps impart distinctive structural characteristics to the resultant product, as discussed above. For example, some of the distinctive structural characteristics noted above include further impregnation by impinging air, a “smooth, satin-like and relatively non-glossy” surface by removing excess and polymerizing in water, and increased production of urethane linkages by drying the substrate before impregnation.

Second, the structural limitations imparted by the process steps of claim 1 are not implied by *Diehr*. Instead, *Diehr* discloses a compression molded material prepared by “a process for molding a lignocellulose material such as wood chips, shavings or the like with an organic polyisocyanate binder in a mold coated with a release agent which contains a catalyst for the polymerization of –NCO groups to form isocyanurate rings” *Diehr* at col. 2:5-9. In *Diehr*, the polyisocyanate is used as a binder with the lignocellulose material to form a resultant material in a conventional gluing apparatus, and a catalyst is used so that the resultant material detaches itself from a press used to compression mold the resultant material. *See e.g., Diehr’s* Example 1 at col. 5:30-45.

Diehr also discloses steeping birch veneers in a mixture of diphenylmethane diisocyanate, catalyst dimethylformamide and pressure molding the veneers together with a middle layer of wood rods between two steels sheets. *See Diehr* at col. 7:12-22. In addition, *Diehr* discloses steeping five birch veneers in a mixture of diphenylmethane diisocyanate and dimethylformamide and pressure molding the stacked veneers together between two aluminum sheets. *See Diehr* at col. 7:28-31. Thus, *Diehr* does not imply the structural limitations of claim 1 because *Diehr* fails to disclose the process steps of claim 1 (*e.g., impregnating* lignocellulosic material with isocyanate resin material, *impinging* air at a high flow rate upon the impregnated

lignocellulosic material, and *polymerizing* the resin by applying water) that would be expected to impart distinctive structural characteristics to the final product.

Third, *Mente* similarly does not imply the structural limitations imparted by the process steps of claim 1. Instead, *Mente* discloses forming a “resinated lignocellulosic mixture...by combining the binder resin with lignocellulosic particles.” *Mente* at Abstract; *see also* col. 2:50-53. Thus, *Mente* teaches forming a mixture of binder resin and particles. Therefore, *Mente* does not imply the structural limitations of claim 1 because *Mente* fails to disclose the process steps of claim 1 (*e.g.*, *impregnating* lignocellulosic material with isocyanate resin material, *impinging* air at a high flow rate upon the impregnated lignocellulosic material, and *polymerizing* the resin by applying water) that would be expected to impart distinctive structural characteristics to the final product.

Therefore, neither *Diehr* nor *Mente*, alone or in combination, teach or suggest all of the limitations in dependent claim 1. For at least these reasons, claims 1-15 are not rendered obvious over *Diehr* in view of *Mente*.


D. Conclusion

The rejection of claims 1-15, 17-34, 37-39, and 41 under 35 U.S.C. § 112, first paragraph, is improper because the limitation that a substrate comprises “a moisture content that is about 0.1 to less than 2% by weight after the substrate is dried and before the substrate is impregnated with the polyisocyanate material,” as recited in independent claim 41, is fully supported by the originally filed disclosure. In addition, the combination of *Diehr* in view of *Mente* does not render claims 1-15, 17-34, 37-39, and 41 obvious because (1) neither *Diehr* nor *Mente* disclose a substrate having a moisture content that is about 0.1 to less than 2% by weight; (2) neither *Diehr* nor *Mente* disclose that a substrate has such a moisture content after being dried

and before being impregnated; and (3) there is no basis for combining and extending the ranges disclosed in *Diehr* and *Mente* to encompass Assignee's claimed range. Moreover, the combination of *Diehr* in view of *Mente* does not render claims 1-15 obvious because neither *Diehr* nor *Mente* disclose process steps of claim 1 that would be expected to impart distinctive structural characteristics to the final product.

Consequently, Assignee respectfully requests that the Board grant Assignee's appeal by withdrawing the rejection of claims 1-15, 17-34, 37-39, and 41 under 35 U.S.C. § 112, first paragraph, and withdrawing the rejection of claims 1-15, 17-34, 37-39, and 41 under 35 U.S.C. § 103.

Respectfully submitted,


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CLAIMS APPENDIX

1. (Previously Presented) The article of claim 41, wherein the lignocellulosic substrate is prepared by

- (1) impregnating a lignocellulosic material with an isocyanate resin material;
- (2) removing excess isocyanate resin from the impregnated lignocellulosic material by impinging air at a high flow rate upon the impregnated lignocellulosic material;
- (3) polymerizing the resin by applying water to the impregnated lignocellulosic material, the water being at a temperature sufficient for polymerization; and
- (4) removing the water from the polymerized resin-impregnated lignocellulosic material.

2. (Previously Presented) The article of claim 1, wherein the impregnated lignocellulosic material is substantially non-conductive.

3. (Previously Presented) The article of claim 1, wherein the lignocellulosic material comprises material selected from the group consisting of medium density fiberboard, high density fiberboard, oriented strand board, particle board, hemp, sisal, cotton stalk, wheat, straw, bamboo, jute, salt water reeds, palm fronds, flax, groundnut shells, hard woods and soft woods.

4. (Previously Presented) The article of claim 1, wherein the article comprises a veneer, sheet or panel.

5. (Previously Presented) The article of claim 1, wherein the article comprises a building component.
6. (Previously Presented) The article of claim 5, wherein the building component comprises a door component.
7. (Previously Presented) The article of claim 5, wherein the building component comprises a subfloor component.
8. (Previously Presented) The article of claim 5, wherein the building component comprises a roofing substrate component.
9. (Previously Presented) The article of claim 5, wherein the building component comprises a soffit component.
10. (Previously Presented) The article of claim 5, wherein the building component is adapted for marine construction.
11. (Previously Presented) The article of claim 1, wherein the article comprises a fence component.

12. (Previously Presented) The article of claim 1, wherein the article comprises a recreational equipment component.
13. (Previously Presented) The article of claim 1, wherein the article comprises a component of a sign.
14. (Previously Presented) The article of claim 1, wherein the article comprises furniture.
15. (Previously Presented) The article of claim 41, wherein said impregnated lignocellulosic substrate is substantially non-conductive.
16. (Cancelled)
17. (Previously Presented) The article of claim 41, wherein the impregnated lignocellulosic substrate further exhibits increased strength over an un-impregnated lignocellulosic substrate.
18. (Previously Presented) The article of claim 41, wherein the impregnated lignocellulosic substrate further exhibits an increased resistance to water over an un-impregnated lignocellulosic substrate.
19. (Previously Presented) The article of claim 41, wherein the lignocellulosic substrate comprises material selected from the group consisting of medium density fiberboard, high

density fiberboard, oriented strand board, particle board, hemp, sisal, cotton stalk, wheat, straw, bamboo, jute, salt water reeds, palm fronds, flax, groundnut shells, hard woods and soft woods.

20. (Previously Presented) The article of claim 41, wherein the polyisocyanate material comprises methylene diphenyl diisocyanate or poly(methylene diphenyl diisocyanate).

21. (Previously Presented) The article of claim 41, wherein the polyisocyanate material comprises polyisocyanate resin.

22. (Previously Presented) The article of claim 41, wherein the lignocellulosic substrate comprises a veneer, sheet or panel.

23. (Previously Presented) The article of claim 41, wherein the article comprises a building component.

24. (Original) The article of claim 23, wherein the building component comprises a door component.

25. (Original) The article of claim 23, wherein the building component comprises a subfloor component.

26. (Original) The article of claim 23, wherein the building component is adapted for marine construction.

27. (Original) The article of claim 23, wherein the building component comprises a soffit component.

28. (Original) The article of claim 23, wherein the building component comprises a roofing substrate component.

29. (Previously Presented) The article of claim 41, wherein the article comprises a fence component.

30. (Previously Presented) The article of claim 41, wherein the article comprises a recreational equipment component.

31. (Previously Presented) The article of claim 41, wherein the article comprises a component of a sign.

32. (Previously Presented) The article of claim 41, wherein the article comprises a furniture component.

33. (Previously Presented) The article of claim 41, wherein the substrate is impregnated by application of the polyisocyanate material upon the surface of the substrate with a nozzle.

34. (Previously Presented) The article of claim 41, wherein the substrate is impregnated by soaking the substrate in the polyisocyanate material.

35-36. (Cancelled)

37. (Previously Presented) The article of claim 41, wherein the impregnated substrate is further impregnated with the polyisocyanate material by impinging air upon the surface.

38. (Previously Presented) The article of claim 41, wherein excess polyisocyanate material on the surface of the impregnated substrate is removed by impinging air upon the surface.

39. (Previously Presented) The article of claim 41, wherein the smooth, low-gloss surface of the impregnated substrate is polymerized by water.

40. (Cancelled)

41. (Previously Presented) An article comprising a lignocellulosic substrate impregnated with a polyisocyanate material,

wherein the impregnated lignocellulosic substrate comprises a smooth, low-gloss surface,

and

wherein the substrate comprises a moisture content that is about 0.1 to less than 2% by

weight after the substrate is dried and before the substrate is impregnated with the

polyisocyanate material.

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42-44. (Cancelled)

EVIDENCE APPENDIX

<< No Evidence Attached >>

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RELATED PROCEEDINGS APPENDIX

<< No Information on Related Proceedings Attached >>